

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

APPLICANT: Christophe Girold et al.  
SERIAL NO.: 10/510,519  
FILING DATE: October 6, 2004 CONFIRMATION NO.: 8870  
TITLE: Vitrification Furnace With Dual Heating Means  
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ART UNIT: 1791

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Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450**

**APPEAL BRIEF  
IN SUPPORT OF APPLICANTS' APPEAL  
TO THE BOARD OF PATENT APPEALS AND INTERFERENCES**

Dear Sir/Madam:

The Applicants hereby submit this Brief in support of appeal from a final decision of the Examiner mailed January 25, 2008 in the above-referenced application. The Applicants respectfully request consideration of this Appeal Brief by the Board of Patent Appeals and Interferences for allowance of the above referenced application.

### **REAL PARTY IN INTEREST**

The real party in interest is Commissariat A L'Energie Atomique, a French company, which is the assignee of the present patent application.

### **RELATED APPEALS AND INTERFERENCES**

NONE

### **STATUS OF CLAIMS**

The above-mentioned application originally contained 10 claims. During prosecution, Claims 7-10 were cancelled and Claims 11-12 were added. Thereafter, Claims 11 was cancelled and Claims 13-14 were added. Claims 1-6 and 12-14 are pending in the application and set forth in the Appendix hereto. Claim 1 is an independent claim.

Under the final rejection mailed on January 25, 2008, claims 1-6, and 12-14 remain rejected under 35 U.S.C. § 112, first and second paragraphs. Claims 1, 3-6, 12-14 remain rejected under 35 U.S.C. § 103(a) as being allegedly unpatentable over U.S. Patent 5,750,822 to Gotovhikov et al. with or without FR. 96 09382. Claim 2 remains rejected under 35 U.S.C. § 103(a) as being allegedly unpatentable over U.S. Patent 5,750,822 to Gotovhikov et al. with or without FR. 96 09382 in view of WO 98/05185 to Boen.

The Applicants appeal the above rejection regarding claims 1-6 and 12-14 with respect to the 35 U.S.C. § 103(a) and 112, first and second paragraph rejections and hereby traverse every ground of rejection set forth in the final rejection.

## **STATUS OF AMENDMENTS**

No amendment has been filed subsequent to final rejection.

## **SUMMARY OF THE CLAIMED SUBJECT MATTER**

One or more embodiments are recited in claims 1-6, and 12-14 and their equivalents. The present section of this Appeal Brief is set forth merely to comply with the requirements of 37 C.F.R. § 1.192(c)(5) and is not intended to limit 1-6, and 12-14 in any way. See MPEP § 1206.

**In an embodiment recited in Claim 1, a vitrification furnace comprising a crucible** (Specification, Page 6, Paragraph 0019; Figure 1). At least one oxygen plasma torch on an upper part of the crucible. (Specification, Page 7, Paragraphs 0024-0025; Figure 1). At least one inductor winding outside the crucible. (Specification, Page 7, Paragraphs 0022-0023; Figure 1). The oxygen plasma torch configured to create an oxidising atmosphere in the furnace, characterised in that the inductor winding is arranged under the crucible. (Specification, Pages 9 and 10, Paragraphs 0029-0030).

**GROUND OF REJECTION TO BE REVIEWED ON APPEAL**

Whether the rejection under 35 USC §112, first paragraph to claims 1-6, and 12-14 is proper.

Whether the rejection under 35 USC §112, second paragraph to claims 1-6, and 12-14 is proper.

Whether the rejection under 35 USC §103(a) to claims 1-6 and 12-14 over Gotovchikov in view of FR 96 09382 is proper.

## ARGUMENTS

### **I. The 35 USC §112, First Paragraph Rejection to Claim 1-6 and 12-14**

35 USC §112, First Paragraph recites that the specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor of carrying out his invention. 35 USC §112 (West, 2007).

Within the office action dated January 25, 2008 (hereinafter “Last Office Action”), the examiner states that at least one oxygen plasma torch is new matter and not disclosed in the original specification. (Last Office Action, Page 3, Paragraph 1). The Applicants respectfully disagree.

An oxygen plasma torch is a plasma torch having a structure in which oxygen is fed as a plasmagenic cladding gas. In particular to an embodiment, the specification states the following:

The plasma torches 5 and 6 are designed to operate twinned, one as an anode and the other as a cathode, after receiving an appropriate electrical polarisation. Both are composed of a cooled metallic electrode surrounded by a first inner sleeve supplied with source plasmagenic gas protecting the electrode from oxidation, and a second external sleeve supplied by the plasmagenic cladding gas. In this case, the plasmagenic cladding gas is **oxygen**.

(Specification, Page 7, Paragraph 0025) (emphasis added).

Additionally, in describing the advantages of an embodiment of the system, the specification details the application of oxygen plasma at the surface of the molten material.

(Specification, Page 9, Lines 20-22). For at least these reasons, the term “oxygen plasma torch” is fully supported by the specification, and withdrawal of the rejection is respectfully requested.

## **II. The 35 USC §112, Second Paragraph Rejection to Claim 1-6 and 12-14**

Claims 1-6 and 12-14 stand rejected under 35 U.S.C. § 112, second paragraph, as allegedly being indefinite for failing to particularly point out and distinctly claim the subject matter that the Applicants regards as the invention. This rejection is respectfully traversed.

Under M.P.E.P. 2173.02, in reviewing a claim for compliance with 35 U.S.C. 112, second paragraph, the examiner must consider the claim as a whole to determine whether the claim apprises one of ordinary skill in the art of its scope and, therefore, serves the notice function required by 35 U.S.C. 112, second paragraph, by providing clear warning to others as to what constitutes infringement of the patent. The essential inquiry pertaining to this requirement is whether the claims set out and circumscribe a particular subject matter with a reasonable degree of clarity and particularity. Definiteness of claim language must be analyzed, not in a vacuum, but in light of:

- (A) The content of the particular application disclosure;
- (B) The teachings of the prior art; and
- (C) The claim interpretation that would be given by one possessing the ordinary level of skill in the pertinent art at the time the invention was made.

In determining definiteness, the examiner should allow claims which define the patentable subject matter with a reasonable degree of particularity and distinctness. Some latitude in the manner of expression and the aptness of terms should be permitted even

though the claim language is not as precise as the examiner might desire. Examiners are encouraged to suggest claim language to applicants to improve the clarity or precision of the language used, but should not reject claims or insist on their own preferences if other modes of expression selected by applicants satisfy the statutory requirement. M.P.E.P. 2173.02

For at least the reasons stated above under the 112 First Paragraph discussion, the term “oxygen plasma torch” is fully supported by the specification on Pages 7 and 9 of the specification. Thus, the “oxygen plasma torch” language in the claims is definite and clear and fully understandable by one skilled in the art. Accordingly, withdrawal of the rejection is respectfully requested.

## **II. The 35 USC §103(a) Rejection**

To establish a *prima facie* case of obviousness under 35 USC §103(a), three basic criteria must be met. First there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in the applicant's disclosure. M.P.E.P. 2141.

In determining obviousness four factual inquiries must be looked into in regards to determining obviousness. These are determining the scope and content of the prior art; ascertaining the differences between the prior art and the claims in issue; resolving the level of ordinary skill in the pertinent art; and evaluating evidence of secondary consideration.

Graham v. John Deere, 383 U.S. 1 (1966); KSR Int'l Co. v. Teleflex, Inc., No 04-1350 (U.S. Apr. 30, 2007) (“ Often, it will be necessary . . . to look into related teachings of multiple patents; the effects of demands known to the design community or present in the marketplace; and the background knowledge possessed by a person having ordinary skill in the art, all in order to determine whether there was an **apparent reason** to combine the known elements in the fashion claimed by the patent at issue. To facilitate review, this analysis **should be made explicit.**”) (emphasis added).

In determining the differences between the prior art and the claims, the question under 35 U.S.C. 103 is not whether the differences themselves would have been obvious, but whether the claimed invention as a whole would have been obvious. Stratoflex, Inc. v. Aeroquip Corp., 713 F.2d 1530 (Fed. Cir. 1983). Thus, when considering the whole prior art reference its entirety, portions that would lead away from the claimed invention must be considered. W.L. Gore & Associates, Inc. v. Garlock, Inc., 721 F.2d 1540 (Fed. Cir. 1983), See M.P.E.P. 2141.02. Thus, it is improper to combine references where the references teach away from their combination. In re Grasselli, 713 F.2d 731 (Fed. Cir. 1983).

Within the Last Office Action, it was stated that Gotovchikov discloses a vitrification furnace 10 that includes a crucible 26 and heating means. The means including at least one plasma torch 18 in an upper portion of the crucible (col. 4, Lines 30-35), and at least one induction coil 34 located outside the crucible (col. 5, Lines 6-29). It is also alleged that Gotovchikov discloses that the plasma torch is designed to fire oxygen, and therefore reads on the claimed oxygen plasma torch (col. 3, Lines 1-23). It is admitted in the office action that Gotovchikov does not disclose that the induction coil 34 is located under the crucible, however it would have been obvious to one skilled in the art that the location of the induction



coil could be located under the crucible, since the induction coil of Gotovchikov performs the same function as that of the induction coil in the claims.

Applicants' specification describes a system in which a stronger oxidation is obtained with oxygen provided by the plasma torch so that the chemical reduction of the glass into a metallic phase is avoided, even when the waste may contain carbon, hydrogen or sulphur (Specification, Paragraph 0008). This is performed such that better characteristics of the glass matrix are upheld and the contents of the crucible are in a uniform composition.

In contrast, Gotovchikov accepts the creation of the metallic phase 80, 82 and removes it from the slag phase for disposal or recycling. The metallic phase is non-radioactive which indicates a lower-grade oxidation with less efficient means. (Gotovchikov, Col. 2, Lines 63-65).

As mentioned above, it is stated in the Last Office Action that "Gotovchikov disclose that the plasma torch is designed to fire oxygen, therefore it reads on the claimed oxygen torch." Applicants respectfully disagree.

There is no teaching or suggestion in Gotovchikov that the element fired by the torch is oxygen. The portion of the Gotovchikov disclosure which relates to oxidation of the smelt in the crucible does not indicate how the smelt is fed by an oxidizer. In the excerpt provided by the Examiner, the sentences concerning the torch (Gotovchikov, Col. 3, Lines 7-9) and the oxidation (Gotovchikov, Col. 3, Lines 13-16) are not related to each other, considering that they are separated by another sentence (Gotovchikov, Col. 3, Lines 9-13). This intermediate sentence states, "The application of induction currents of relatively low frequency provides the intense electromagnetic mixing of the smelt, producing optimal mass exchanges conditions for the metal and slag phases." (Gotovchikov, Col. 3, Lines 9-13). Thus, this intermediate sentence is directed to the application of induction currents of relatively low

frequency for mixing the smelt, which is quite another aspect of the invention not related to the plasma heating and oxidation mentioned in Gotovchikov.

Further, the plasma torch is mentioned primarily to heat and melt the smelt, and particular, the non-metallic upper slag phase 79 (Gotovchikov, Col. 4, Lines 45-49). However, nothing indicates in Gotovchikov that the plasma torch itself is used to perform the oxidation. Gotovchikov instead insists that the oxidation is made either with solid additives poured into the crucible with the waste or with a gas flow. In particular, the Gotovchikov disclosure only mentions oxygen, air or  $\text{KMnO}_4$ , which are solids or gases, but not in the plasmagenic gas of oxygen (Gotovchikov, Col. 3, Line 13).

Moreover, Gotovchikov does not teach or suggest that an oxidizing atmosphere is created by the oxygen plasma torch, as expressly recited in Claim 1. In fact, Gotovchikov describes that the crucible is contained in a vacuum chamber 26 which is evacuated by a pump 58 (Gotovchikov, Col. 6, Lines 17-19). In particular, it is expressly stated in Gotovchikov, “[t]he plasma torch support/positioning mechanism 20 allows the plasma torch assembly 18 to be moved within the sealed vacuum chamber 26 for directing a high temperature plasma onto an inner portion of the cold crucible.” (Gotovchikov, Col. 4, Lines 39-42). Alternatively, the atmosphere within the crucible has inert gases in order to operate a pyrolysis mode to transform the organics into safer hydrocarbons. (Gotovchikov, Col. 6, Lines 58-64). However, one skilled in the art would understand that pyrolysis is a decomposition of material without combustion and without the use of oxygen. For at least these reasons, one skilled in the art reading this passage of Gotovchikov would thus understand that Gotovchikov does not stand for the proposition of creating an oxidizing atmosphere in the crucible, let alone an oxidizing atmosphere provided by an oxygen plasma torch. For at least these reasons, one skilled in the art would not find the motivation from

Gotovchikov to reach the claimed subject matter. Further, the use of Gotovchikov does not teach or suggest each and every element/limitation of the claims. Accordingly, withdrawal of the rejection is respectfully requested.

### **SUMMARY**

For at least the reasons stated above, the 35 USC 112 and 103 rejections to claims 1-6 and 12-14 are improper and should be withdrawn. Applicants respectfully submit that all appealed claims in this application are patentable and requests that the Board of Patent Appeals and Interferences overrule the Examiner and direct allowance of the rejected claims.

### **FEES**

Applicants hereby pay the fee for a brief in support of an appeal required under 37 C.F.R. § 1.17(c) and 1.192. If there are any further charges not accounted for herein, please charge them to our deposit account No. 50-1698.

Respectfully submitted,

Dated: October 27, 2008

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## CLAIMS APPENDIX

1. (Previously Presented) Vitrification furnace comprising:  
a crucible; and  
at least one oxygen plasma torch on an upper part of the crucible and at least one inductor winding outside the crucible, the oxygen plasma torch configured to create an oxidising atmosphere in the furnace, characterised in that the inductor winding is arranged under the crucible.
2. (Previously presented) Vitrification furnace according to claim 1, characterised in that the crucible comprises a sole plate made of refractory material and a shell placed upright on the sole plate, the shell having a continuous structure around a circumference and being made of metallic material.
3. (Previously presented) Vitrification furnace according to claim 1, wherein the at least one plasma torch further comprises a first plasma torch and a second plasma torch, the first and second plasma torches configured to be electrically polarised to create an arc between each other.
4. (Previously presented) Vitrification furnace according to claim 3, characterised in that the torches are moveable in the crucible.
5. (Previously presented) Vitrification furnace according to claim 4, characterised in that the torches are free to slide approximately vertically with respect to the inductor winding.
6. (Previously presented) Vitrification furnace according to claim 1, characterised in that the torch is laterally offset from the inductor winding.
- 7-11. (Cancelled)

12. (Currently amended) Vitrification furnace according to claim 1, characterised in that the oxidising atmosphere in the furnace prevents formation of a metallic phase in furnace load contents in the crucible.

13. (Previously presented) Vitrification furnace according to claim 1, wherein the torch exclusively heats furnace load content initially, wherein the torch and inductor winding both operate thereafter to simultaneously heat the furnace load contents.

14. (Previously presented) Vitrification furnace according to claim 5, characterised in that the first and second torches heat the furnace load in the crucible and are brought close to the furnace load contents during heating.

**EVIDENCE APPENDIX**

NONE

**RELATED PROCEEDINGS APPENDIX**  
NONE